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Title:	LOS ALAMOS NATIONAL LABORATORY INFORMATION SESSION University of Maryland – College Park
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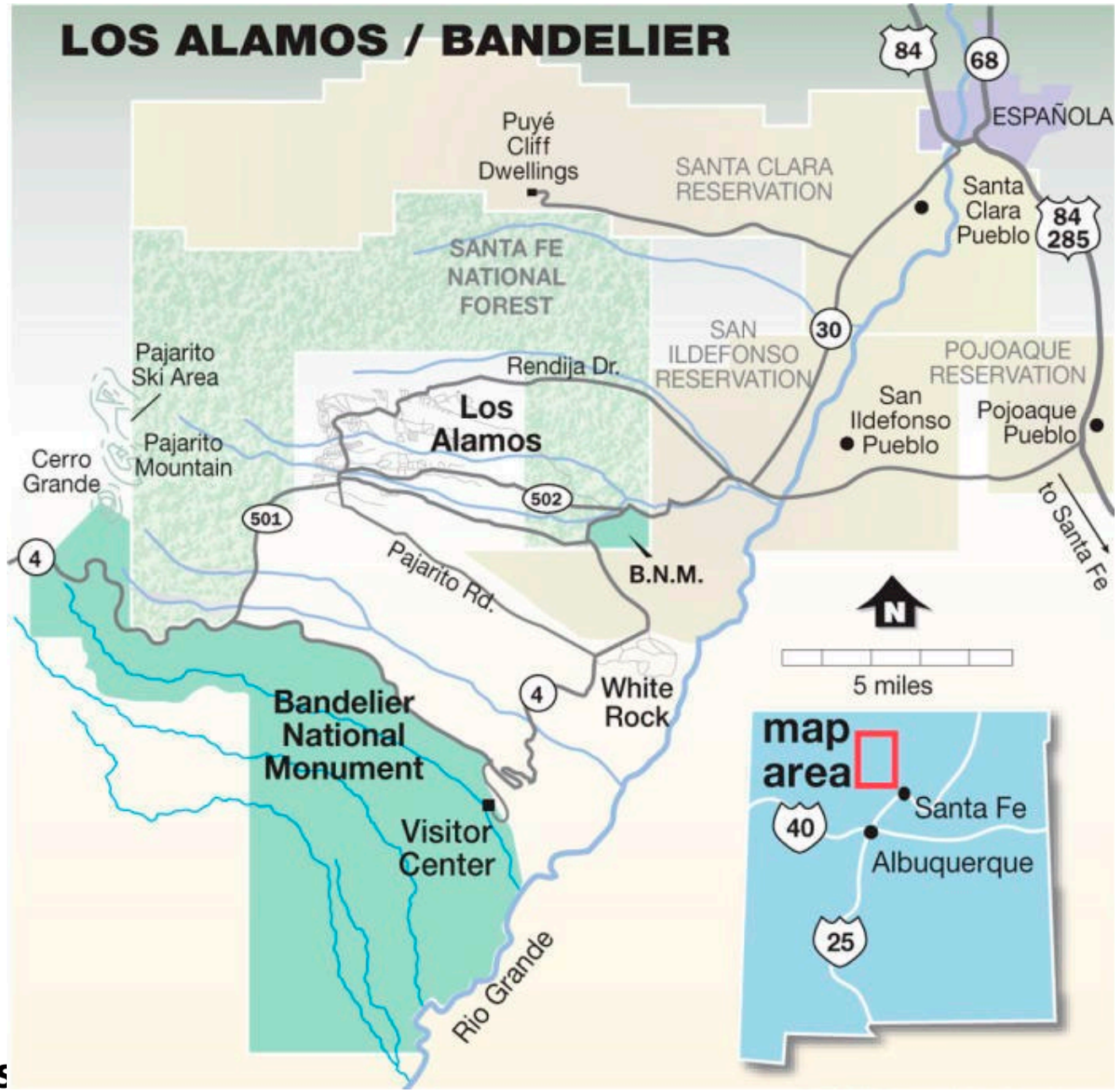
Issued:	2019-10-28

LOS ALAMOS NATIONAL LABORATORY INFORMATION SESSION
University of Maryland – College Park

LA-UR-YY-XXXX

Los Alamos NATIONAL LABORATORY EST. 1943


LOS ALAMOS / BANDELIER
84
68
ESPAÑOLA
Puyé Cliff Dwellings
SANTA CLARA RESERVATION
Santa Clara Pueblo
84 285
SANTA FE NATIONAL FOREST
30
SAN ILDEFONSO RESERVATION
POJOAQUE RESERVATION
San Ildefonso Pueblo
Pojoaque Pueblo
Pajarito Ski Area
Rendija Dr.
Los Alamos
Pajarito Mountain
Cerro Grande
502
501
4
Pajarito Rd.
B.N.M.
to Santa Fe
N
5 miles
White Rock
Bandelier National Monument
Visitor Center
Rio Grande
map area
Santa Fe
40
Albuquerque
25

Our Mission at Los Alamos

- Our Mission Is National Security

  We develop and apply science and technology to:

  - Ensure the safety and reliability of the U.S. Nuclear Deterrent
  - Reduce global threats
  - Solve other emerging national security challenges

Work at Los Alamos is organized under three principle directorates

Science, Technology, & Engineering	Weapons	Operations
• Global Security • Chemical, Earth, & Life Sciences • Physical Sciences • Simulation & Computation	• Weapons Physics • Weapons Engineering • Weapons Production	• Capital Projects • Business Management • ESHQSS • Facilities & Operations

LOS ALAMOS NATIONAL LABORATORY

Veterans
9.8%

Individuals with disabilities
3.3%

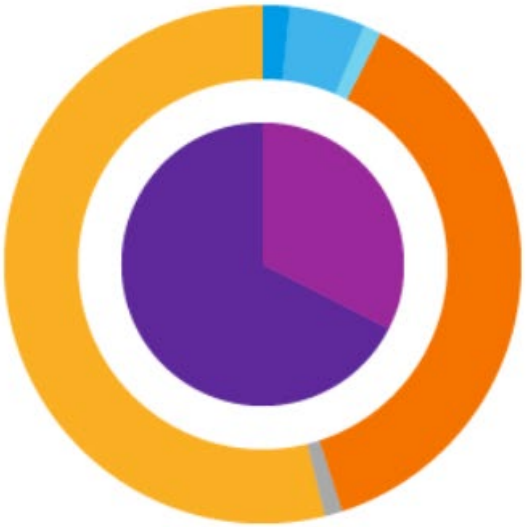
#M

Millennials in workforce
32.8%

LOS ALAMOS NATIONAL LABORATORY

Female
32.6%

Male
67.4 %



2.0% American Indian, Alaskan Native, Native Hawaiian, or Other Pacific Islander
5.2% Asian
1.2% Black or African American
37.3% Hispanic or Latino
1.3% Two or more races
53.1% White

Fast Facts & Latest Demographics

People

- 12,752 total employees
- Students 1,613

Place

- 35 miles NW of Santa Fe, NM, located on ~34.7 square miles of DOE-owned property
- Over 2,000 individual facilities, including 47 technical areas with 8 million square feet under roof.
- 13 nuclear facilities
- Funding for FY18: approximately $2.66 Billion

Workforce Demographics

- 39% of employees live in Los Alamos, the remainder commute from Santa Fe, Espanola, Taos, and Albuquerque
- Average age – 43
- 68% male, 32% female, 47% minorities
- 66% hold university degrees
  - 30% hold undergraduate degrees
  - 17% hold master's degrees
  - 19% hold PhD's

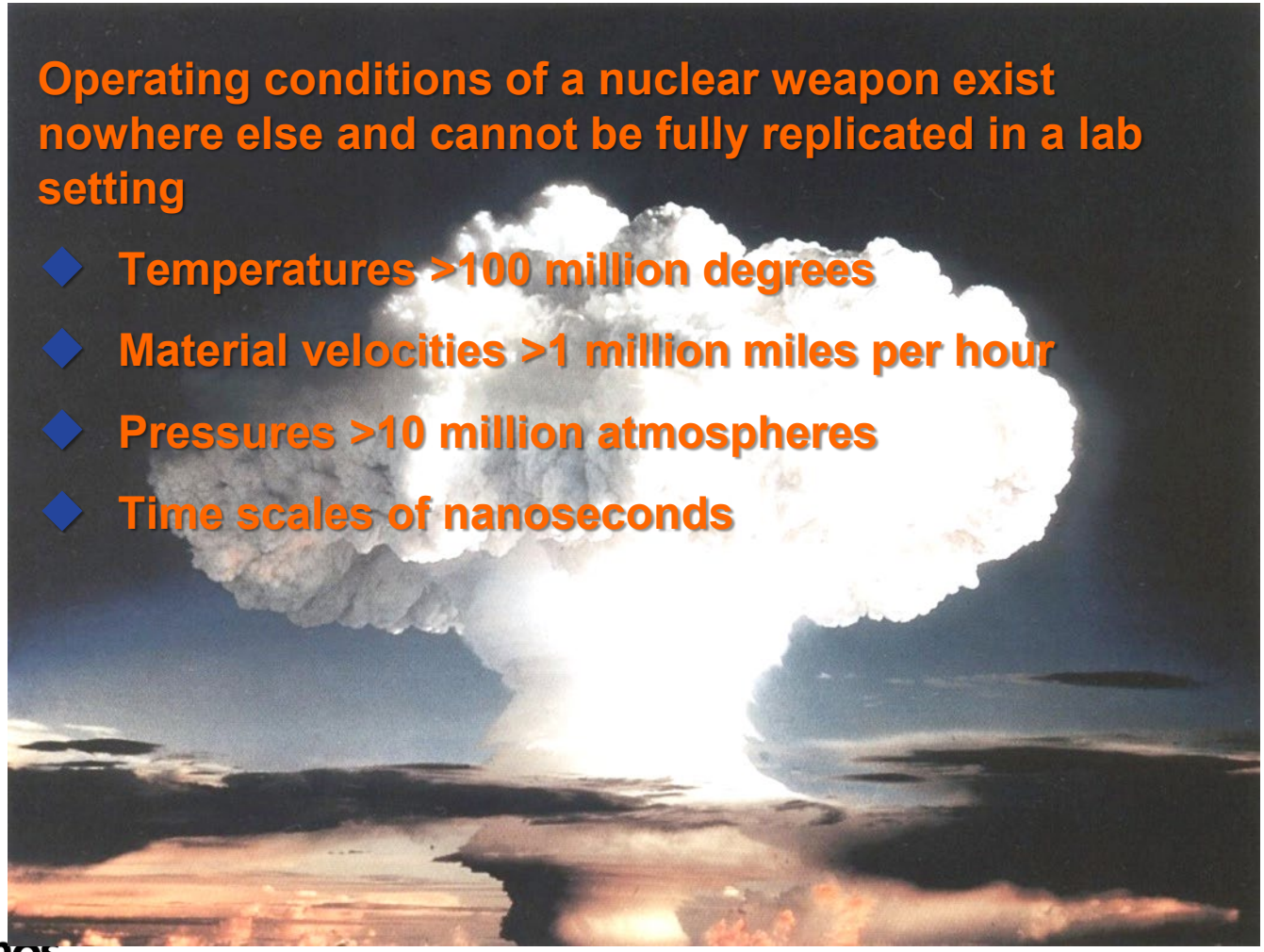
Life in Northern New Mexico

- Extensive Outdoor Recreational Opportunities (>7,000ft elevation)
  - Hiking, biking, skiing, hunting, fishing, camping, climbing, and more!
  - Beautiful and diverse landscape, fresh air, and huge blue sky, 4 seasons
- A Multitude of Cultural Experiences
  - Native American and Mexican art, history, and events
  - Various musical and theatrical performances and venues
  - Museums, galleries, and native artisans abound
  - Unique and excellent local cuisine (Red or Green?)

- Comforts of a Larger City Are Nearby
  - Many employees live in and commute from Santa Fe (<1 hr. distance)
    - Shopping, night life, capital of New Mexico (Park-n-Ride available)
    - Affordable student housing for rent
  - Albuquerque is a medium-sized city
    - Two hour drive makes it a long commute (Park-n-Ride is available)
    - It's a great weekend destination for shopping and entertainment!

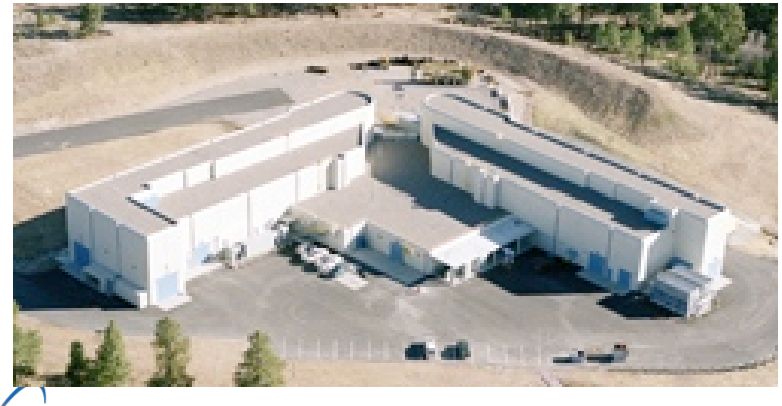
(Option to live in a rural setting too!)

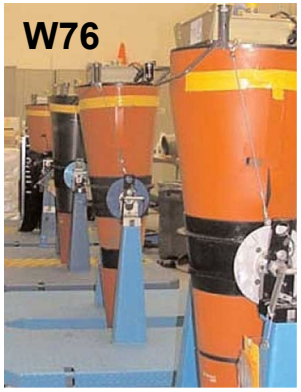
Why is the challenge of Stockpile Stewardship so difficult?



W and Q Division are central to Stockpile Stewardship: Certify the safety, reliability, and performance of the nuclear weapons stockpile in the absence of underground nuclear testing.

- Los Alamos is the design agency for warheads which constitute more than 60% of Nation's nuclear deterrent and the majority of the on-alert deterrent
- The Weapon Engineering capability supporting the enduring and future stockpile and associated integrated experiments at LANL is organized within the Weapon Systems Engineering Division
- The Weapons Stockpile Modernization Division is focused on new technologies and capabilities for the future stockpile





Supercomputing is essential to Stockpile Stewardship and other scientific missions underway at Los Alamos

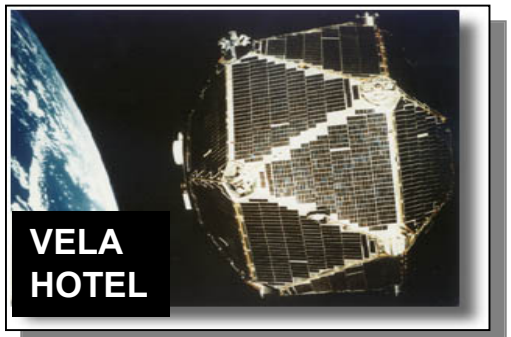
- **Road Runner - the world's first machine to operate at over 1 Petaflop (10^{15})**
- **Coupled with our codes, our evolving supercomputing platforms continue to offer unprecedented simulation capabilities**

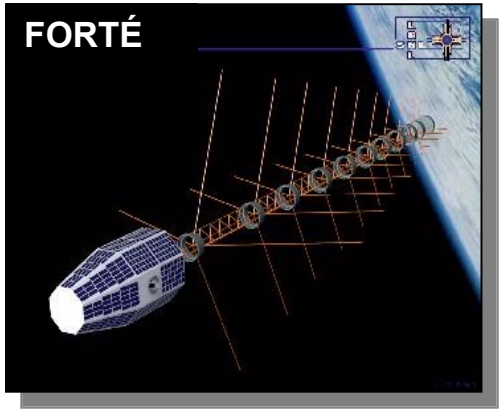
Metropolis Center for Modeling & Simulation

Cielo

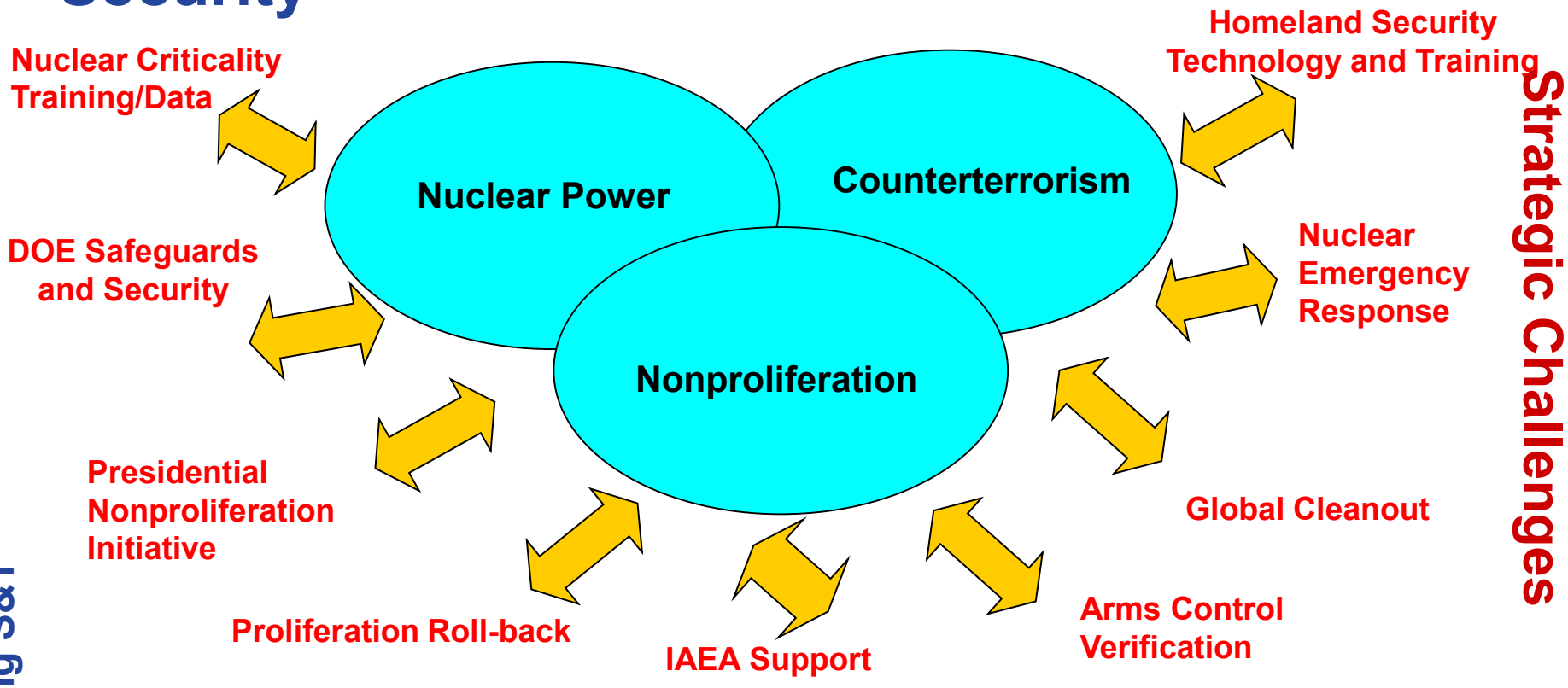
Intelligence and Space Research (ISR) Division

- ***Los Alamos Has a Long History in Remote Sensing***
  - Space treaty verification in space since 1962
  - Seismic remote sensing expertise since 1980s
  - Remote sensing for nonproliferation national policy since 1990s
- ***Recognized leaders in many areas on the national scene***
  - Many remote sensing/space missions: ALEXIS/Blackbeard, FORTE, MTI, CFE, NASA planetary science missions.





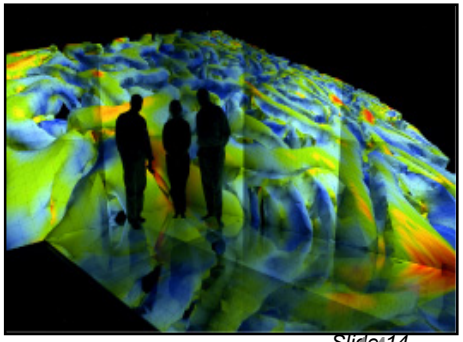
Nuclear Engineering and Nonproliferation Division: Nonproliferation - Key to Global Security



Underpinning S&T

Chemistry, nuclear physics, solid state physics, high energy physics, materials science, information science, statistics, mathematics, critical experiments, theoretical physics, earth science, space science, nanotechnology

The *Theoretical Design Division* applies theoretical and computational physics to the design, performance, and safety of nuclear weapons



The kinds of work we do:

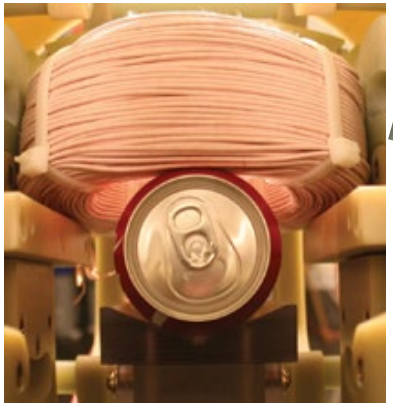
- *Model evaluation/validation*
- *Simulations/designs of experiments*
- *Large-scale simulations with many exotic materials and complex interacting physics*

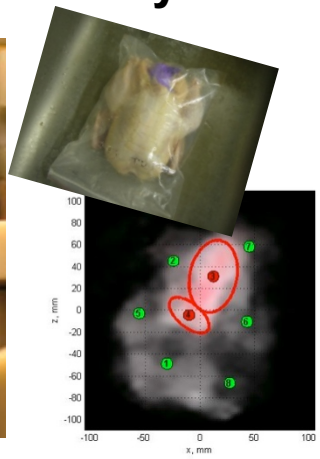
The Theoretical Design Division needs a wide range of scientific expertise, including (but not limited to):

- *Physics – plasma, atomic, molecular, astrophysics*
- *Engineering – nuclear, mechanical, materials, ...*
- *Fission, fusion and related areas*
- *Detonation physics/high explosives/combustion*
- *Material science (strength, equation of state, failure)*
- *Transport (neutral and charged-particle)*

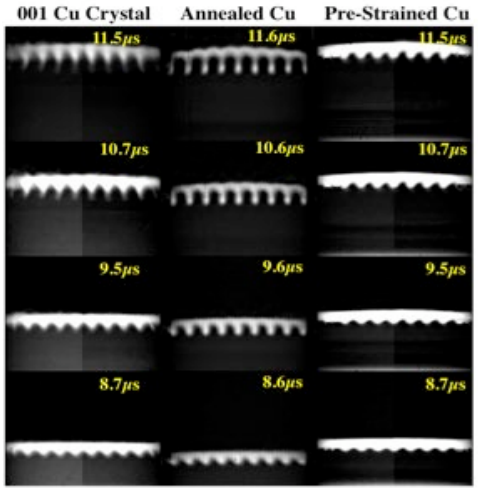
The Physics (P) Division furthers understanding of the physical world, generates new and improved technology in experimental physics, and establishes a physics foundation for current and future programs

- **Applied Modern Physics**

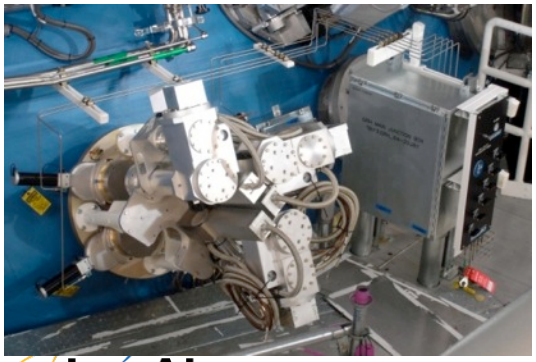


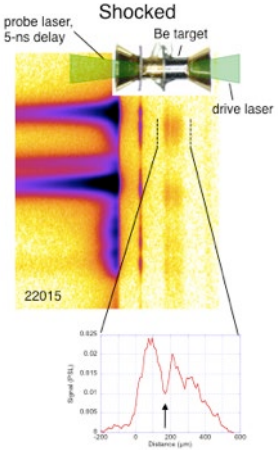


- **Neutron Science & Technology**

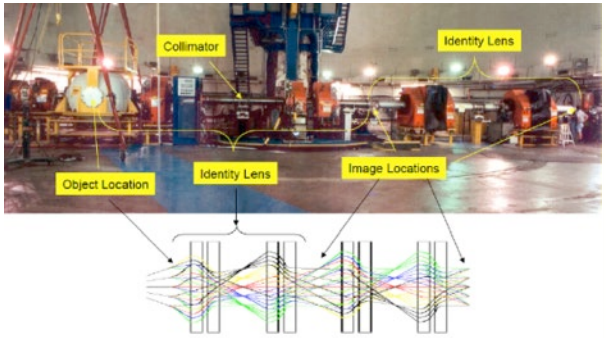


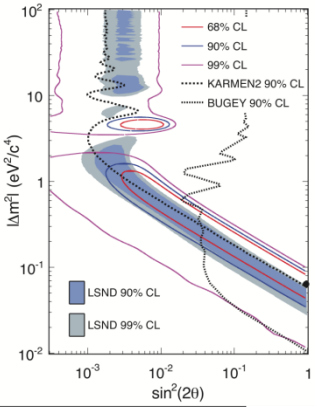
- **Plasma Physics**





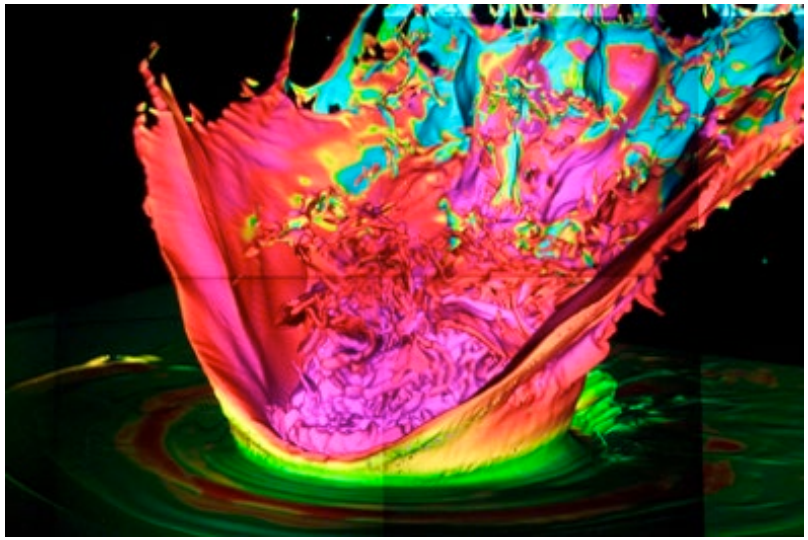
- **Subatomic Physics**





The *Computational Physics Division* has responsibility to develop and maintain multiphysics simulation codes and databases

- ***Computational Models*** **– sets of equations describing various weapons phenomenology and numerical solution techniques**
  - **Radiation/Hydrodynamics**
  - **Neutronics**
  - **Thermonuclear burn**



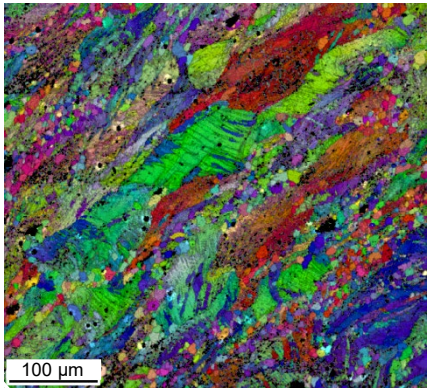
- ***Physical Data*** **– unique for each**
  - **Neutron cross sections**
  - **Equation of state**
  - **Opacities**

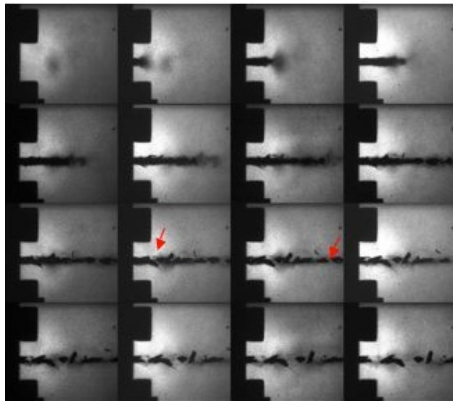
- ***Nuclear and Nonnuclear Test Data*** **– needed for calibration to overcome our lack of full physics understanding**

The Materials Science and Technology (MST) Division provides expertise from fundamental research to national security application solutions

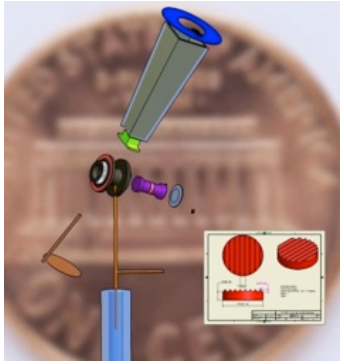
- Materials Synthesis and Processing

- Microstructural and Property Characterization

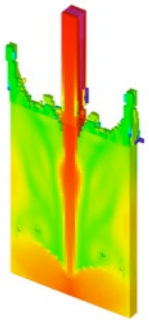


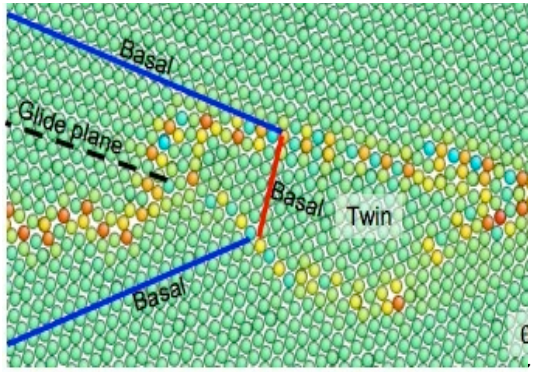


■ Component and Target Assembly



■ Materials Modeling

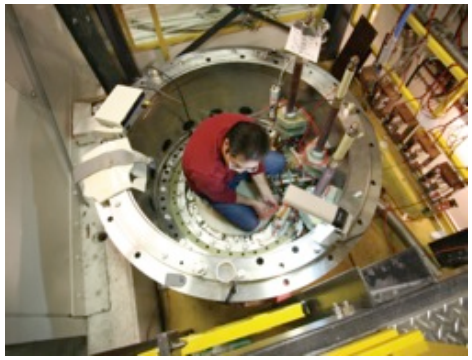




MPA Division will enable the development of new technologies that solve pressing National energy and security challenges by exploring and exploiting materials and their properties, developing practical applications of materials, and providing world-class user facilities.

Materials Chemistry

Hydrogen Storage Engineering Center
Hydrogen Storage Center of Excellence



Condensed Matter and Magnet Science

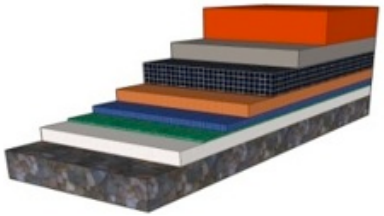
National High Magnetic Field Lab-Pulsed Field Facility

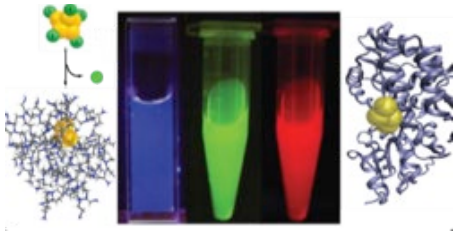
Sensors and Electrochemical Devices

Center for Integrated Nanotechnologies

Center for Materials under Irradiation and Mechanical Extremes

Superconductivity Technology Center

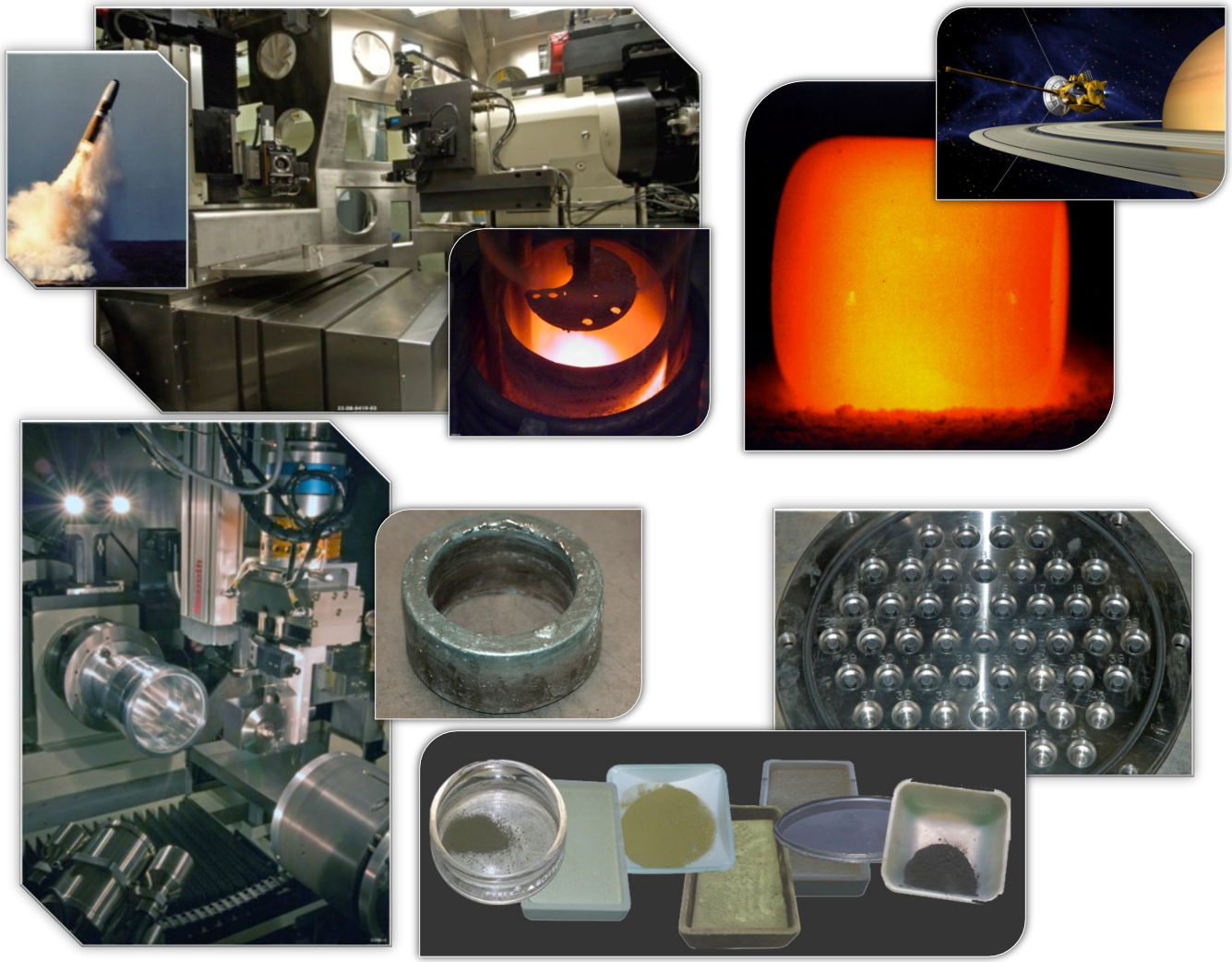




Plutonium Science and Manufacturing

We deliver products

- **Build New Pits/ Detonators**
- **Surveillance Report**
- **Disassemble Pits**
- **Fissile Material Disposition**
- **Purified Pu Oxide and Metal**
- **Fuels Development**
- **Heat Sources**



The Scope of Chemistry at Los Alamos

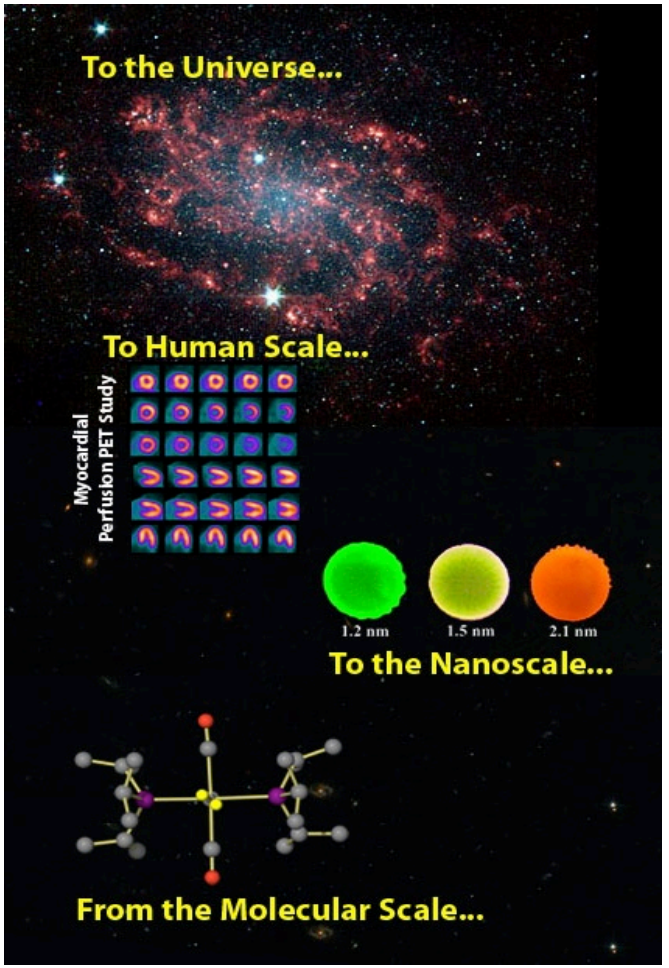
Chemistry touches virtually everything the Laboratory does from astrophysics exploring the origins of the universe (nuclear sciences), to human health, to the nano- and molecular scale understanding and application of quantum dots.

Core strengths

- Radiochemistry and nuclear science
- Isotope science and actinide chemistry
- Chemical synthesis and transformations
- Measurement science
- Signature science
- Chemistry of materials
- Computational chemistry and data analysis

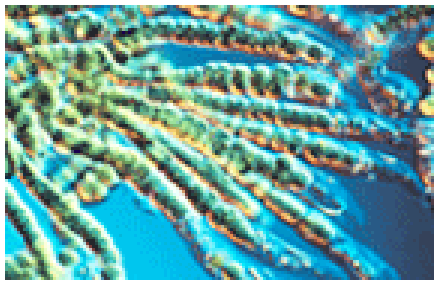
Research directions

- Biomedical Technologies
- Nuclear Forensics
- Energy – Environment Nexus
- Energy Production, Storage and Utilization
- Weapons/Emerging Threats
- The Chemistry of Materials in Extreme Conditions (MaRIE)



Bioscience Mission

- Reduce natural and deliberate threats to human populations and the environment;
- Prevent the proliferation of biological and chemical weapons;
- Provide technologies for their detection and for defense against their use; and
- Contribute to the well-being of world populations and ecosystems through research in public health and alternative energy.



LANL Earth and Environmental Science

Disciplines
- Atmospheric Science
- Ecology
- Environmental Science
- Geology
- Geochemistry
- Geomaterials
- Geophysics
- Hydrology

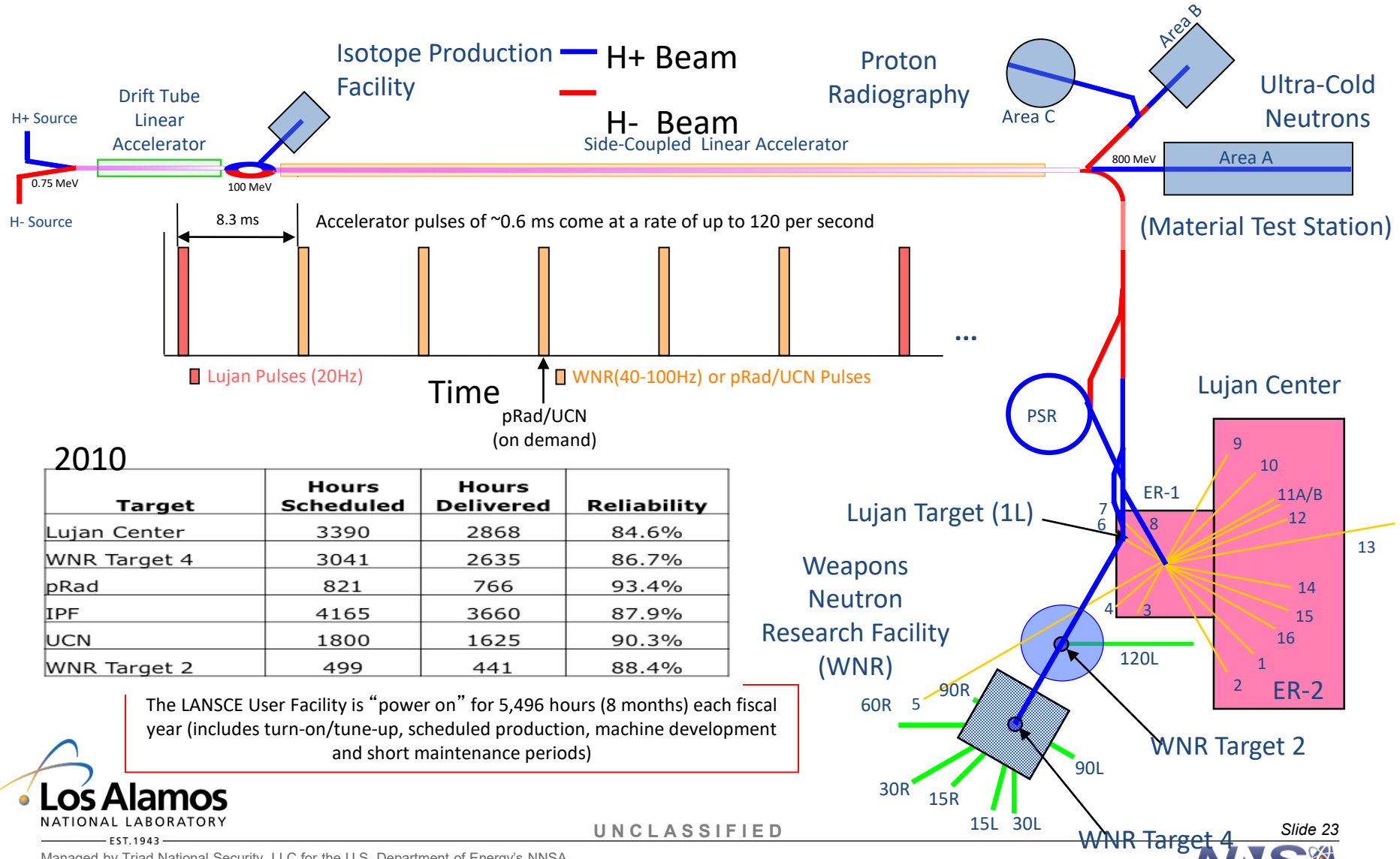
LANL Mission Areas
- Energy Security
- Global Security
- Nuclear Deterrence

Programs
- Waste Isolation Pilot Plant
- Ground-based Nuclear Explosion Monitoring (GNEM)
- Field Instrument Deployment Office (FIDO)
- Coupled Ocean and Sea Ice Modeling (COSIM)
- Fossil Energy (FE) Programs
- Environmental Restoration
- Weapons Phenomenology and Effects
- Laboratory-Directed Research and Development (LDRD) Projects

Scientific Areas
- Repository Science
- Climate Science
- Sustainable Energy
- Global Security
- Fundamental Science

Capability Focus
- Multi-Scale Measurements
- High Performance Computing
- Signatures for Attribution
- Innovative Applications

The Los Alamos Neutron Science Center (LANSCE) provides fundamental and National Security research

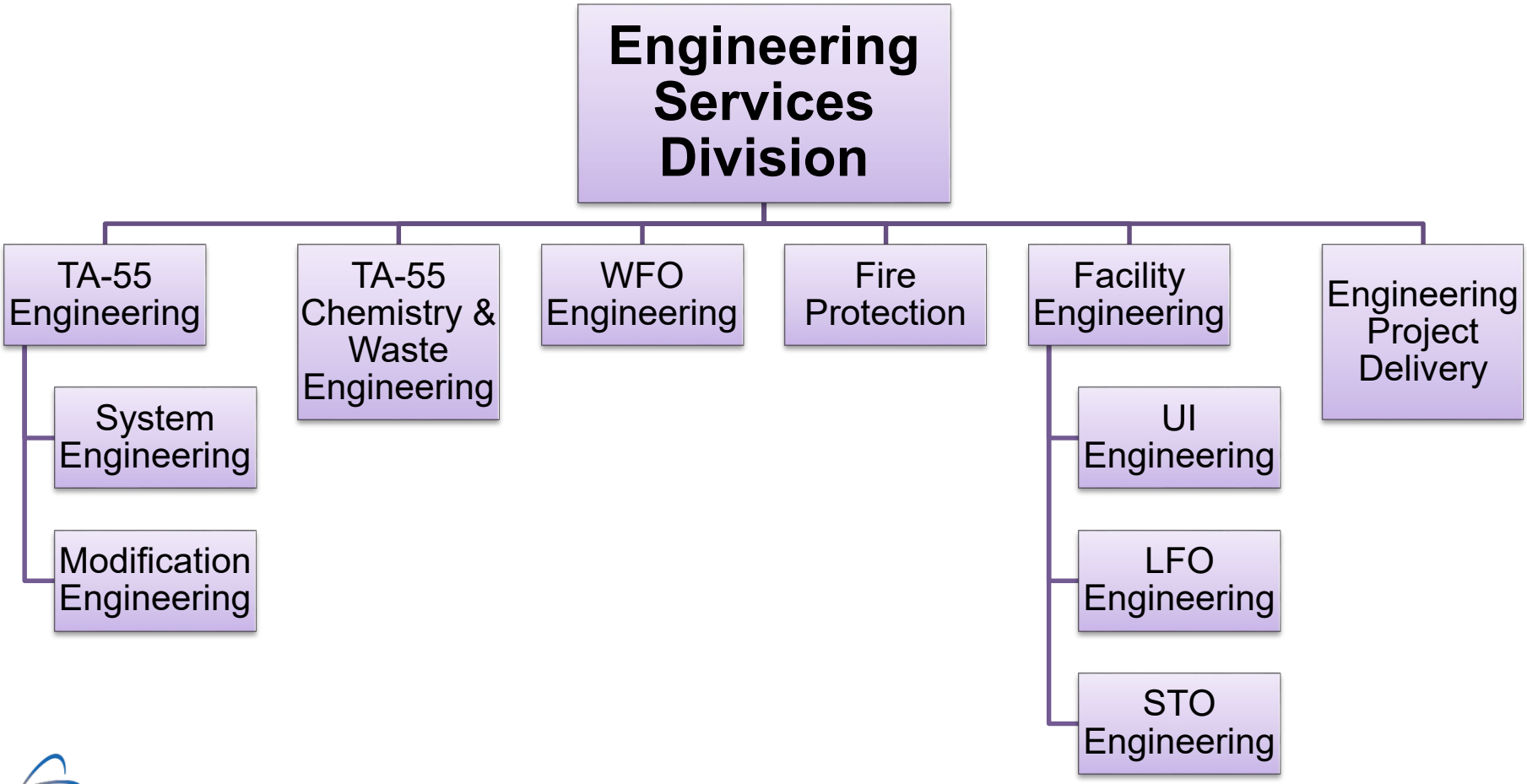


2010

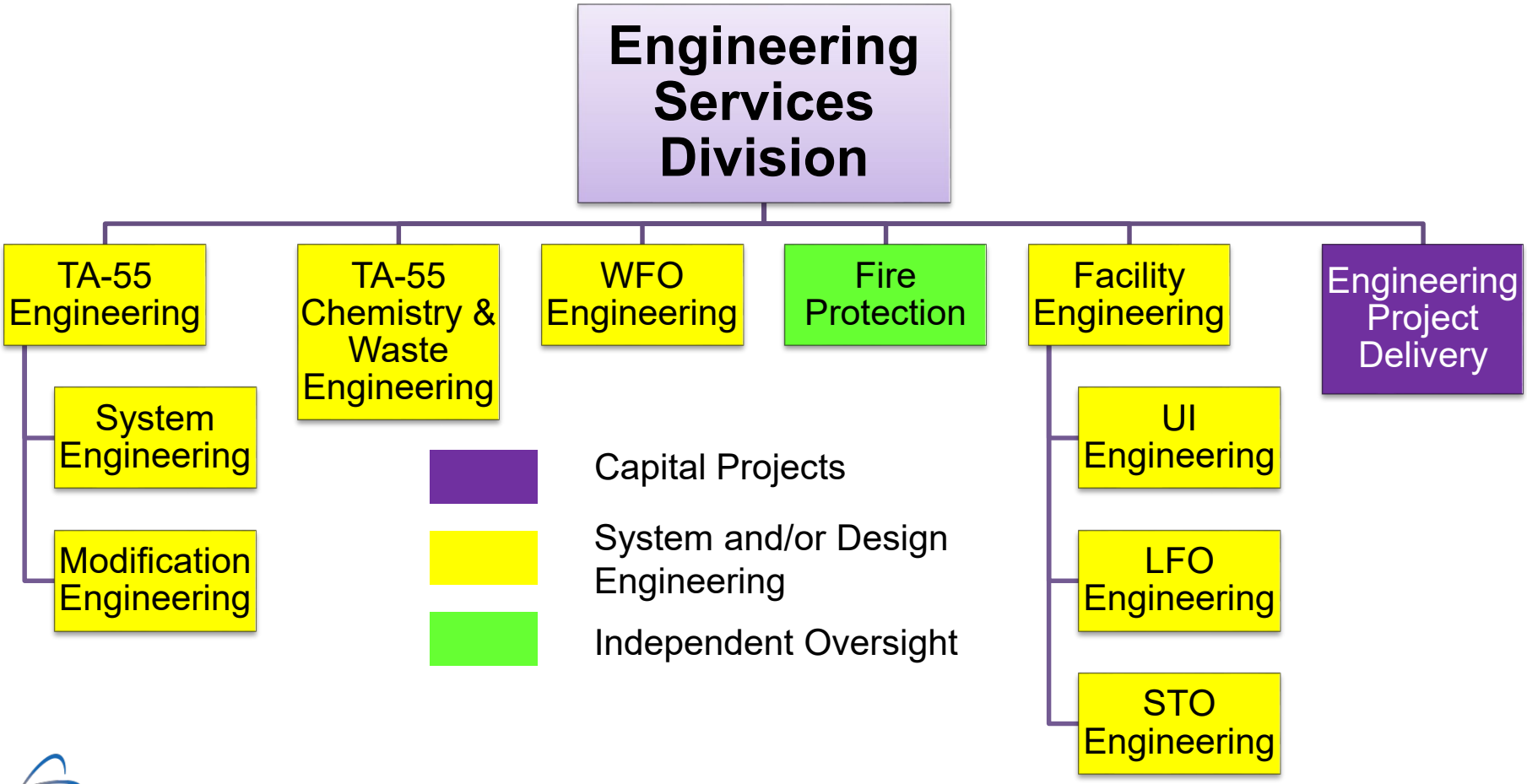
Target	Hours Scheduled	Hours Delivered	Reliability
Lujan Center	3390	2868	84.6%
WNR Target 4	3041	2635	86.7%
pRad	821	766	93.4%
IPF	4165	3660	87.9%
UCN	1800	1625	90.3%
WNR Target 2	499	441	88.4%

The LANSCE User Facility is "power on" for 5,496 hours (8 months) each fiscal year (includes turn-on/tune-up, scheduled production, machine development and short maintenance periods)

Engineering Services Division



Engineering Services Division



Internship and Career Opportunities

- Los Alamos has a continuing need for outstanding scientific talent
- We strive to build relationships which provide this talent
  - Educational Partnerships
    - Extensive Student Program
      - Approximately 1200+ students employed each year
      - Undergraduate, Post-Baccalaureate, Graduate, Pos d Post Doctoral appointments
    - Collaborations with many academic institutions
  - Career-Oriented Environment
    - Student Pipeline Initiative

LANL Student / Postdoc Programs

Program	Requirements
Undergraduate (UGS)	• Documented acceptance into an undergraduate academic program • Minimum of 12 credit hours per semester in an accredited college • Maintain 3.0/4.0 cumulative GPA
UGS Post-Bachelor's Internship	• Awarded a bachelor degree within the last 3 years • Not yet been accepted and enrolled in a graduate program • May remain in this category for up to two years
Graduate (GRA)	• Provide documentation of acceptance in a graduate program • Enrolled and maintain minimum of 6 graduate credit hours / semester • 3.2/4.0 cumulative GPA
Post-Masters (GRA)	• Awarded a master degree within the past 3 years • Not yet been accepted into another master's program or PhD program • May remain in this category for up to two years
Postdocs	• Must complete all Ph.D. requirements by their hire-on date • Submission within 5 years of completing all requirements for Ph.D.

You can work as Los Alamos as a US Citizen without Security Clearances

- Students and Postdocs typically do not need a Security Clearance until some point in their returning relationship with LANL
- Handling classified information responsibly and securely is a component of many jobs at Los Alamos National Laboratory
- Many long-term Laboratory positions require a Department of Energy "Q" Clearance
  - Typically requires United States Citizenship
  - In-depth 40+ page personal background questionnaire
  - One to Two Year federal background investigation
  - Advanced clearances required for some positions
    - These can include polygraph and periodic drug screenings
- The Laboratory is supportive of those in the clearance process
- All new employees are required to take a drug test before hiring and a new hire physical
- All employees are subject to a random drug test while employed at LANL

Lab Benefits

- Alternative Work Schedules - 9/80, 5/40, some 4/10
- Competitive Salaries
- Comprehensive Medical, Dental, and Vision Insurance
- Paid Sick Leave – 8 hours/month
- 12 Paid National Holidays
- Vacation starts at 3 weeks of paid vacation/year
- Parental/Maternity Leave
- Onsite Full-Service Exercise Facilities
- Retirement Plan – 401(k), LANL match
- Career Development and Educational Opportunities
- Safe and Secure Work Environment

Application Process

Apply on-line, please visit

http://www.lanl.gov/jobs

or

https://jobs.lanl.gov

Application Process

- IRC74925 – Engineer 1 – ES-FE/Facilities Engineering
- IRC74981 – Cognizant Systems Engineer (CSE) 2 (ES-FE)
- IRC75022 – Cognizant Systems Engineer (Engineer 3/4) (ES-FE)
- IRC76015 – Fire Protection Engineer 3/4 (ES-FP)
- IRC75715 – Engineering Undergraduate Internship Program
- IRC75716 – Engineering Graduate Internship Program
  - We are looking for a summer student for ES-FP

Upcoming

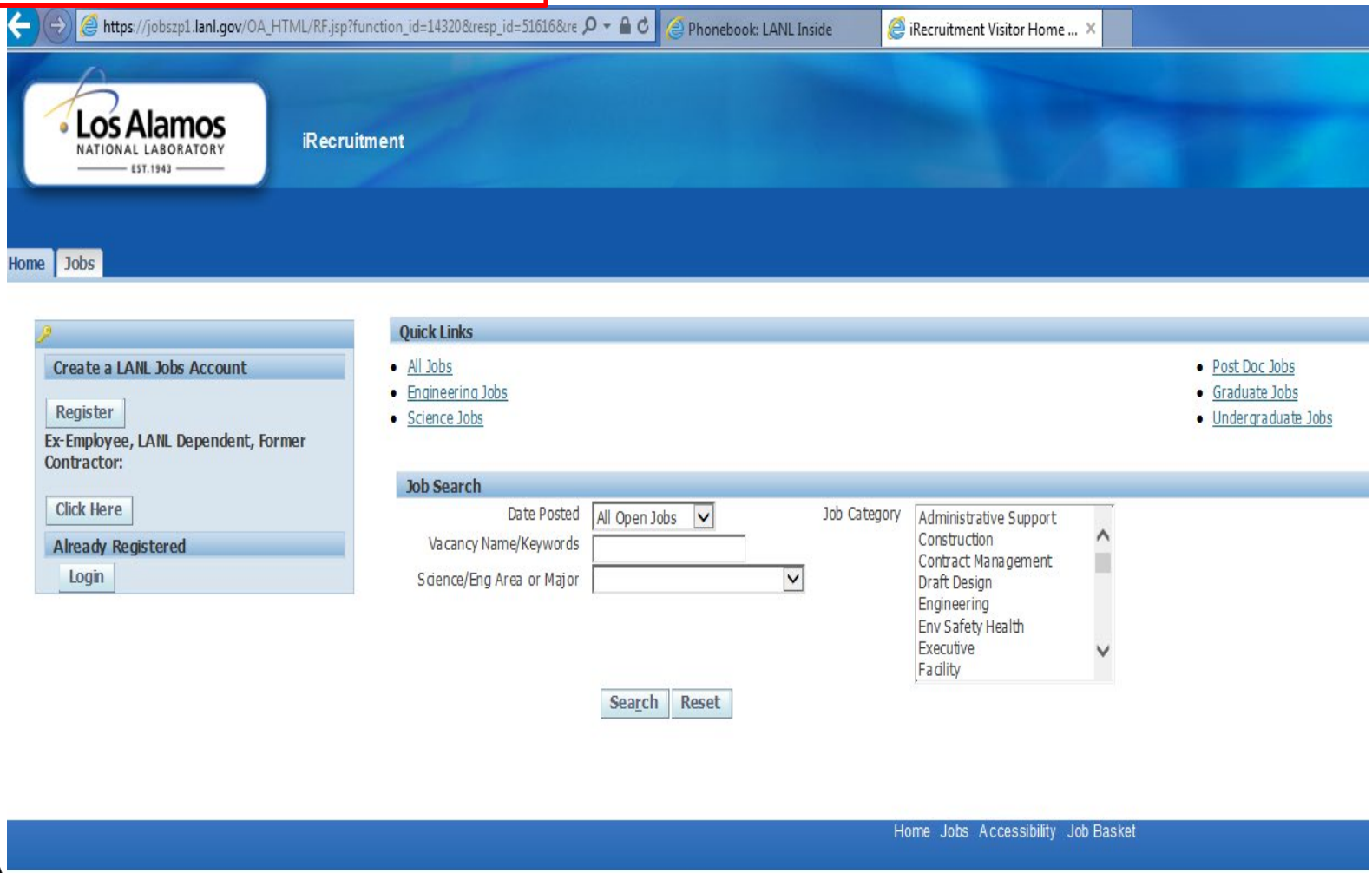
ES-FP – Fire Protection 1/2 to be posted soon. Hiring 5 FPEs in 2020.

Application Process – jobs.lanl.gov

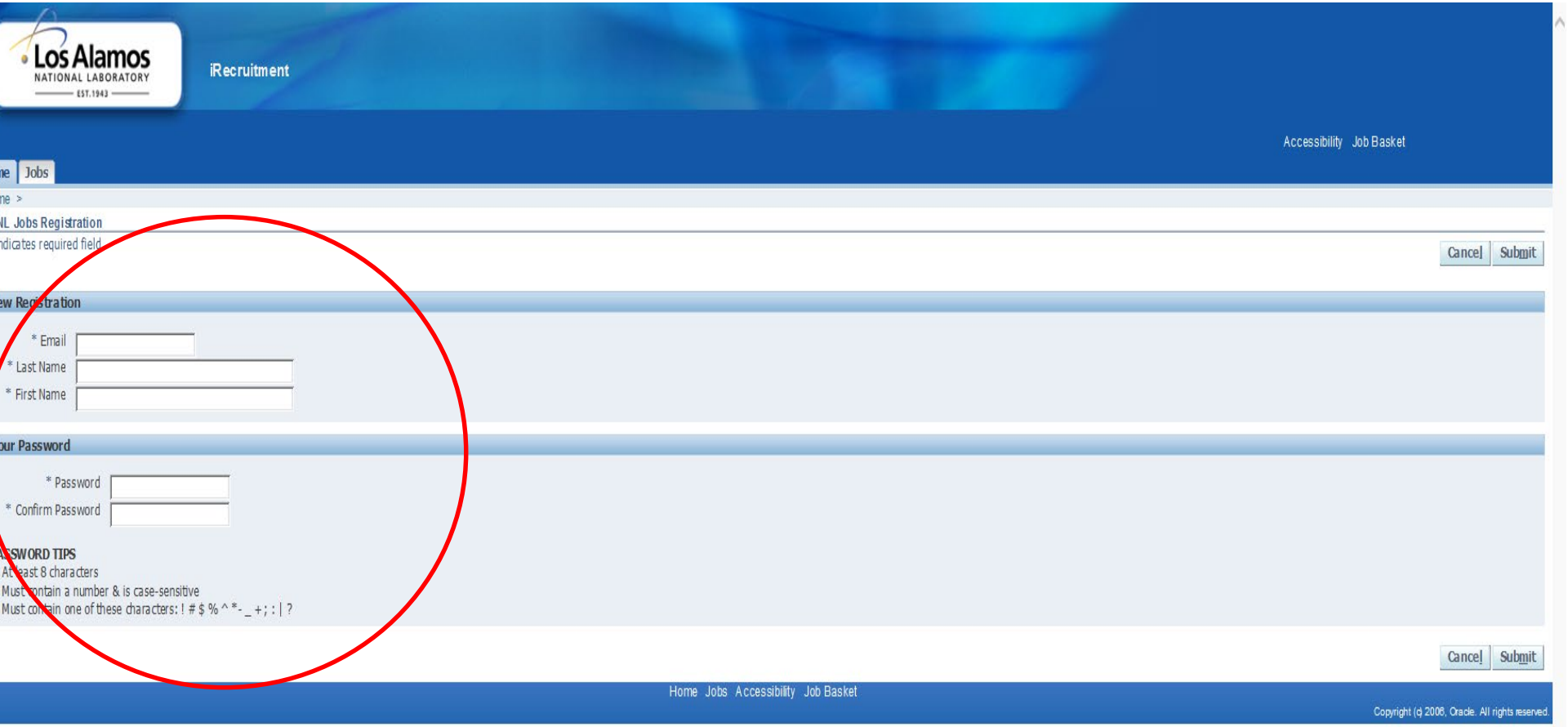
- Regular/ Term Career Employment
  - Apply on-line to specific vacancy announcements (IRCs)
- Student Programs (Undergrad, Post-Bac)
  - Engineering Internship Program, Vacancy Name IRC75715
- Graduate Student (GRA)
  - Engineering Internship Program, Vacancy Name IRC75716
- ~~Postdoctoral Program~~

iRecruit Home

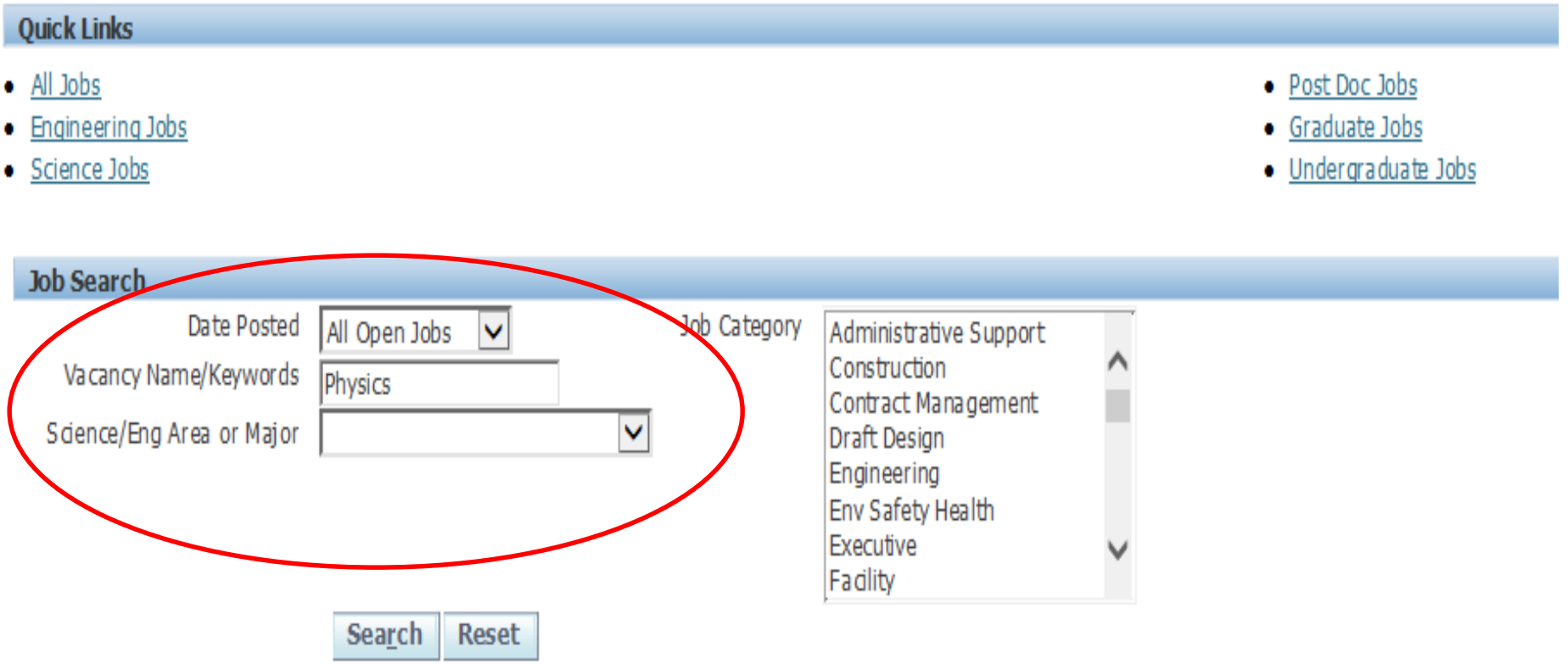
JOBS.LANL.GOV



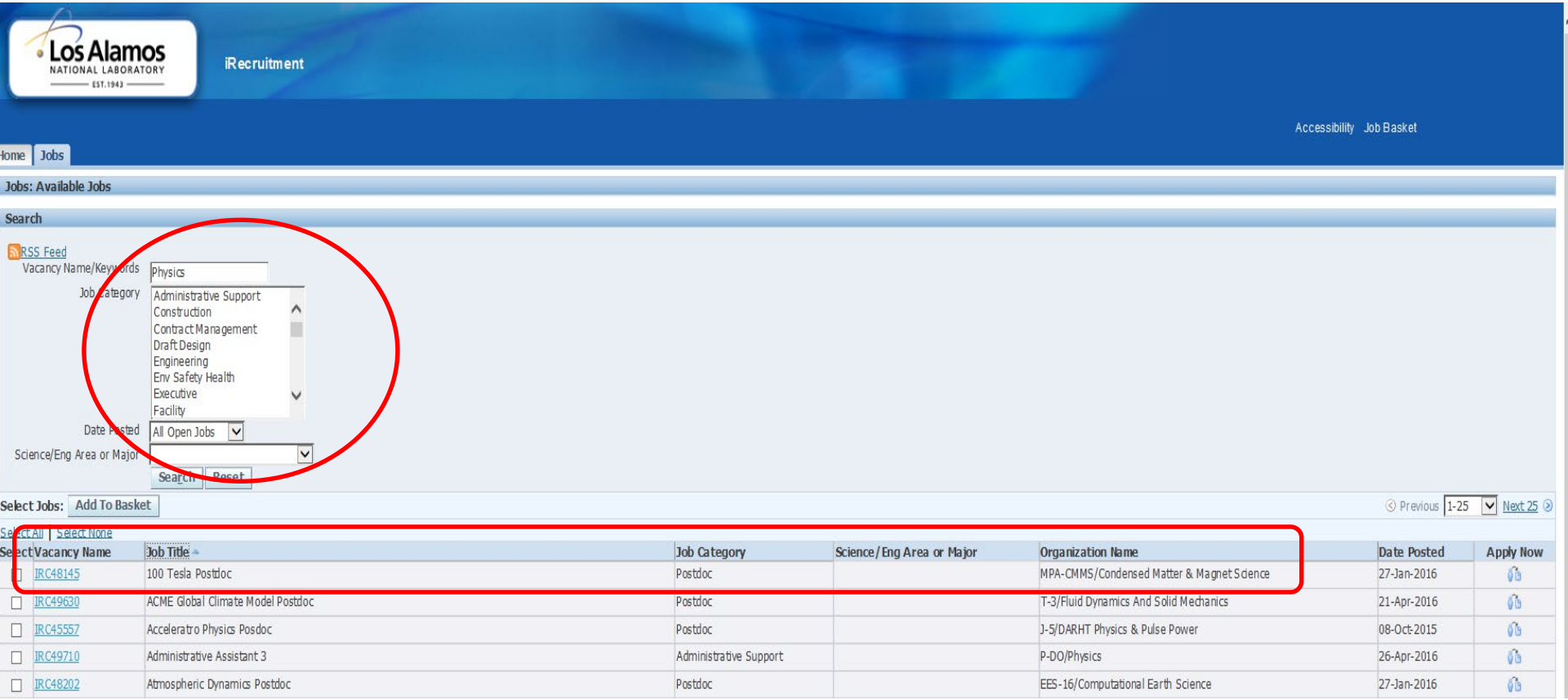
Registration Page



Keyword Search



Keyword Results



W and Q Division are central to the National Nuclear Stockpile Stewardship Mission

- Stockpile Stewardship: Certify the safety, reliability, and performance of the nuclear weapons stockpile in the absence of underground nuclear testing.
- The Weapon Engineering capability supporting the enduring and future stockpile and associated integrated experiments at LANL is organized within the Weapon Systems Engineering Division
  - Annual Assessment (larger category of work)
  - Stockpile Maintenance
    - Surveillance and Production
    - Weapon Response
    - Annual Assessment
  - Experimental Projects and Programs
    - Small and Large-scale Hydrodynamic testing
    - Science Campaigns – Sub-critical (Gemini)
    - Global Security support
- The Weapons Stockpile Modernization Division is focused on new technologies and capabilities for the future stockpile
  - Lead Weaponization of weapon lifetime extension designs
    - B61 Alt 357, B61-12 LEP, W76 LEP, W88 Alt 370
    - Concept development and stockpile studies
  - Experimental Testing
  - Environmental testing capabilties/test execution
- The Weapons Program relies upon many other technical capabilities drawn from across Laboratory to accomplish mission
  - Many areas (e.g. materials science (high explosives, polymers, adhesives, welding,…), advanced manufacturing, special material processing (Be, DU,tritium,…)), are significantly funded by the weapons program

LANSCE includes a collection of national user facilities that also support principal Laboratory missions and research needs with a focus on National Security

Research area	Needs/Drivers	Thrusts	Facility
Materials and Bioscience	National Security Materials science Bioscience	Processing-structure-performance Fundamental properties Short/long range order Processing-structure-performance Superconductivity, Hydrogen storage…. Biotoxin mechanisms Protein function (location of Hydrogen) Self-assembly -Emergent Phenomena -Defects and Interfaces	Lujan
Nuclear Science	National Security Ties to materials strategy Nuclear energy Astrophysics Other nuclear physics	Precision Fission, outputs, capture: materials and diagnostics Fission, capture: advanced fuels Capture, nucleosynthesis processes Level densities	WNR Lujan
Materials Dynamics	National Security	High explosives, shock dynamics, material damage, implosion dynamics - Extreme Environments	pRad
Extreme Radiation Environments	National Security Advanced fuels Ties to materials strategy Semiconductor upset	Weapon component qualification High power fuel irradiation testing Industry standard for testing, cosmic ray upset - Extreme Environments	WNR MTS WNR
Fundamental Nuclear Science	Particle properties Beyond standard model research Ties to materials strategy	Ultracold neutron collaboration	UCN
Isotopes	Medical therapy Medical, Physics Environment National Security	Production for National Clinical Use (Sr^{82}, Ge) Short lived isotopes Short lived isotopes – SSMP, attribution	IPF